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THE FEVER ENDEMIC IN LOUISVILLE.

BY J. N. M'CORMACK, M. D.
Secretary of the Kentucky State Board of Health.

To the State Board of Health of Kentucky:

Since the latter part of October last I have been engaged in the name of this Board in an investigation into the cause of an endemic of typhoid fever then alleged to be prevailing in the city of Louisville. In this work I have availed myself of the meager health records of the city for the past sixteen years, have personally examined a number of the fever cases and the premises where they occurred, have inspected the streets, alleys, topography, and natural and artificial drainage of the district especially afflicted by the disease, and personally and otherwise made special inquiries as to the method of construction, location, and condition of the vaults and wells, the source and character of the water and milk-supply, and of other conditions and habits likely to influence the health of the inhabitants of this locality. To a lesser degree I have conducted similar investigations as to the health conditions of other portions of the city. In all this work I have had the hearty co-operation of many of the leading physicians of Louisville.

In consequence of the fact that physicians and heads of families are not required to report to the health officer each case of disease dangerous to the public health, it is impossible to give facts bearing on the history of typhoid fever in Louisville in previous years, except those furnished by the mortality tables. With four exceptions, which will be noticed, these tables have been obtained as far back as 1868, and they show the following death-rate from this disease: 43 in 1868, 33 in 1869, 75 in 1871, 82 in 1875, 53 in 1876, 44 in 1877, 72 in 1878, 86 in 1879, 96 in 1880, 146 in 1881, 114 in 1882, 106 in 1883, 145 in 1884. No health report was made in 1870, 1872, and 1873, and that for 1874 could not be obtained. In most of these tables deaths from typho-malarial fever were reported as typhoid fever, and to escape confusion this has been done by me for exceptional years. From these figures it will be seen that although this disease has attracted unusual attention from the medical profession and the public of the city recently, the death-rate from it last year was one less than in 1881, and not greatly in excess of that of 1882 and 1883, and that on the whole the death-rate from this cause has slowly but surely increased with the years. These figures also show that whatever the cause of the disease may be it has taken up a permanent residence in Louisville, unless extraordinary efforts are made to drive it out. In this connection it would be interesting to know the location of cases, or at least of the principal number of cases, in former years, and whether or not the same house or locality has furnished successive cases year after year; but no means exist for obtaining this information for the reasons stated.

As to individual cases of fever my inquiries have only been in regard to cases occurring from August 1st to December 1st, 1884, and had reference entirely to the character and cause of the disease. By means of blank slips for individual cases information was asked from the attending physician on the following points in regard to each case: Name the location, date of attack, distance of vault from house, its depth and condition, condition of cellar, method of disposal of house refuse and kitchen slops, source of water-supply, source of milk-supply, whether or not the house in which the case occurred is in the

flooded districts, whether or not it was possible with the facts at hand to trace the disease to a previous case of the same character, and, under the head of remarks, any other facts observed bearing on the character or cause of the disease. In this way such facts have been more or less perfectly collected in regard to 387 cases occurring within the dates mentioned, which I estimate to be about two thirds of the cases occurring in that time. Of these 387 cases 247 were located in the "west end," a large majority of them within the fever district shown on the map, and particularly in the western portion of this district—the remainder being scattered over other portions of the city. The condition of the vault is noted in 158 cases, being good in 92 cases, and bad in the remainder. It is uniformly stated, when reference is made to this point, that the vaults extend to the gravel formation In a number of instances it is stated that the vault on the same or adjoining lots is from two to fifteen feet from the house; in many that it is full, and in some that it is overflowing. In 8 cases the water-closet was in the house. The condition of the cellar was noted in 143 cases, being good in 102 and bad in the remainder. The method of disposal of house refuse and kitchen slops is noted in 160 cases, being carted away, cremated, or otherwise properly disposed of in 16 cases, and thrown in the back yard, alley, gutter, adjoining lot, or fed to pigs in 144 cases. The source of the water-supply is noted in 314 cases, being from hydrants in 10 cases, from cisterns in 6 cases—4 of these cisterns being located in the cellar—and from wells in 298 cases. The source of the milk-supply is not often stated in sufficiently definite terms for any satisfactory conclusion. Four of these cases were located in the flooded districts. In many instances it is noted that pigs, fowls, cows, or horses are kept on the premises, and in very many that the back yards and alleys are foul. In a few instances it is stated that the premises are in good condition; but in such cases no note is made of the condition of the surrounding premises. In a number of instances more than one case is reported from the same house, and in three instances as many as four cases. The large majority of the cases are reported as mild in character and usually of short duration. In no case, so far as stated, could the disease be traced to a previous case.

From the Christian name in the reports the sex could be determined in 210 cases, and of these 91 were males and 119 females. The age is not usually given, but from conversations with physicians and my own observations I learn that a large proportion of the cases were in children.

In order that each fact brought out in this inquiry may be given its proper weight as a possible factor in the production of disease, it may be well here to make a brief statement of those facts in regard to the natural location and surroundings of the city and of the customs and habits of its inhabitants necessarily connected with its health history.

Louisville was first incorporated as a town by the Virginia Legislature in 1780 and as a city by the Kentucky Legislature in 1828. It is situated on the southern side of the "Falls of the Ohio," in latitude 38° 3′ and longitude 85° 30′. In 1830 it had a population of 10,341, which had steadily increased to 123,758 in 1880. The main portion of the city is built on an alluvial plain, at an average of about fifty feet above low-water mark and four hundred and forty-one feet above the level of the ocean. This plain is interrupted in the eastern and southern portion of the city by Beargrass Creek and its tributaries, and south of the city is continuous with a district of swamp lands several miles in extent. Much of the western, southwestern, and southern portion of the city was once studded over with stagnant ponds and marshes, many of the ponds being of considerable depth, and some of them still existing. These ponds were gradually filled with refuse from the city, usually without previous drainage, and over the surface thus filled a dense and often not overcleanly population has been crowded, with little or no provisions for preventing the furthur pollution of an already polluted soil. The character of the surface and subsoil formation is shown in Fig. 1, except that in many places the sand and gravel come much nearer the surface than the cut would indicate, and that the coarse gravel is usually not so near. The surface clay is mixed with sand, and on repeated tests I have found it quite porous. The subsoil is saturated with water under the entire city at a depth of from twenty-five to forty feet, as shown by the level at which water stands in the wells and privy vaults. The dip of the underlying formation is from southeast to northwest, and the current or drift of this underground lake of soil-water, which furnishes a never-failing supply for

the hundreds of wells, is always slowly flowing in this direction, as is shown on the map.

The water-supply is from the Ohio River, supplied by the reservoir system, and from the public wells, of which there is one for almost every square. The intake for the waterworks is at a safe distance above the city, and samples Nos. 1 and 2 in the tables show the result of the chemical and microscopical examinations of this water at different stages of the river. The large amount of vegetable matter held in suspension causes it to rank low in the chemical analysis, but the small amount of chlorine and the absence of nitrites and free ammonia are favorable to it, and the result of the microscopical examination is still more so.

There are about eight hundred public wells in the city, of which five hundred are of brick and stone, sometimes lined with cement, as represented in Fig. 2; two hundred and fifty of cement, as represented in Fig. 3, and fifty tubular or bored wells, as represented in Fig. 4. Figs. 2 and 3 also show some of the methods by which impurities from the gutters find their way into the wells. For the drawings from which these cuts are made I am indebted to the city engineer, Mr. R. T. Scowden. The brick and cement wells are from thirty-five to forty feet deep, and, as it is impossible for the men to work in water of a greater depth, they never extend more than four or five feet into the water-bearing stratum. In consequence of the sandy character of the soil, the banks are supported by wooden drums while the well is being dug, inside of which the brick wall is built. In sinking the cement wells no temporary drum is required. The tubular wells are seventy-five or more feet in depth. Nearly all the wells are located near the curbing, and are usually at the street corners, where the gutters intersect and where the catch-basins are constructed. In very many instances depressions are to be found in the gutters in front of the pumps, filled with an offensive semi-liquid muck. By the kindness of Mr. Harlan, Superintendent of City Pumps, I examined one of the brick wells on the inside, and the same dirty fluid could be plainly seen trickling down the wall next to the gutter. Mr. Harlan informed me that this was common in all the old wells, and that he removed an average of from twelve to eighteen inches of muck from each of these wells every twelve or eighteen months.

In addition to the danger from direct seepage from the gutters, there is a greater danger of contamination of these wells from the surrounding soil. Every well may be said to drain a circumjacent region which may be represented as an inverted cone, with its apex at the bottom of the well and its base at the surface of the ground, as shown in Fig. 5. The diameter of the base will depend on the depth of the well and the character of the soil, and here would probably be from one hundred to two hundred feet. In most instances such an area would include several vaults, cess-pits, foul back yards, alleys, and other sources of filth. The following forcible and instructive instance of the fouling of wells from a source above their level is quoted from the report of Mr. Child, Officer of Health for certain districts in Oxfordshire, England.

"In consequence of the escape of the contents of a barrel of petroleum or benzoline which had been buried in an orchard, a circuit of wells sixty feet below and two hundred and fifty or three hundred yards distant, became so affected that the occupiers of fifteen houses, containing eighty-two inhabitants, were for ten days unable to use the water for drinking or cooking. The cattle of one of the proprietors, moreover, refused to drink at the spring where they were accustomed to drink. Had this soakage been sewage instead of petroleum, who can doubt that the result might have been wholesale water poisoning, and an outbreak of typhoid fever?"

The accompanying tables give the result of the chemical and microscopical examination of water from the several kinds of wells described, as well as the river water.

Fourteen cases of fever are reported in families who used the water from well No. 15, fourteen from No. 16, thirteen from No. 10, eight from No. 9, seven from No. 12, and so on in lesser numbers throughout the list, there being few wells in this quarter of the city from which cases are not reported.

Sewers have been constructed very generally in the central portion of the city, but house connections are not enforced, and when made are under little or no official supervision, the connections being left largely to the caprice of the owner and the honesty of the plumber. There are some sewers in the western portion of the city, but these have few house connections, and even in the other portions of the city where house connections are had it is a common custom to have privy vaults in the yard for servants; in all other sections the vault sys-

CHEMICAL EXAMINATION OF THE DRINKING-WATERS OF LOUISVILLE, BY J. A. TANNER, M. D.

No.	LOCATION.	Time of Collection.	Odor.	Turbidity	Chlorine Grains per Gal.	Nitrites Parts per 1,000,000.	Ammonia Parts per 1,000,000. Free.	Ammonia Parts per 1,000,000. Albuminoid.	Class of Water According to Wanklyn.	REMARKS.
1	River Water,	Low water,	None,	Slight,	1.50	.000	.000	.100	Class II.	
2	River Water,	Med. high water.	None,	Turbid,	.75	.000	.060	.130	Class III.	The small amount of chlorine and absence of nitrites
3	Well corner Fifth and York,		None,	Little sed	4.00	.000	.000	.050	Class I.	[indicates vegetable matter.
4	Well corner Eighth and Chestnut,		None,	Clear,	5.00	.200	.026	.080	Class II.	The presence of nitrites renders this water suspicious.
5	Well corner Fifth and Jefferson,	Rained the morning of collection.	None,	Clear,	6.50	Trace	.000	.090	Class II.	[suspicious pollution.
6	Well corner Sixth and Jefferson,		None,	Clear,	2.50	.040	.026	.080	Class II.	Free ammonia and nitrites are present and point to
7	Well corner Thirteenth and Grayson,		None,	Clear,	6.75	.200	.026	.130	Class III.	Water of a dangerous character.
8	Well corner Sixteenth and High,		Dis'gr'ble	Smoky,	10.50	.100	5.332	.190	Class III.	Should be condemned absolutely.
9	Well corner Nineteenth and Portland,	Rained the night previous to collection.	Dis'gr'ble	Smoky,	11.00	.100	.026	.210	Class III.	Should be condemned absolutely.
10	Well corner Eighteenth and High,		None,	Clear,	5.00	.000	.000	.060	Class II.	
11	Well corner Eighteenth and Lytle,		None,	Clear,	9.00	.020	.013	.070	Class II.	The presence of such a large amount of chlorine,
12	Well corner Seventeenth and Rowan,		None,	Clear,	4.00	Trace	.000	.080	Class II.	[nitrites and free ammonia is suspicious.
13	Well corner Sixteenth and Lytle,		None,	Clear,	7.00	.200	.052	.100	Class III.	Water of a dangerous character.
14	Well corner Eighteenth and Bank,	Rained two days previous to collection.	None,	Clear,	3.00	Trace	.026	.060	Class II.	[presence of nitrites render this water suspicious.
15	Well corner Seventeenth and Tyler,		None,	Clear,	10.00	.100	.000	.050	Class I.	Ammonia is small in amount, excess of chlorine and
16	Well corner Sixteenth and Bank,		None,	Clear,	4.50	.100	.400	.110	Class III.	Water cf a dangerous character.
17	Well corner Third and Market, §	R'd sev'l days before coll't'n.	None,	Clear,	4.60	.100	.032	.034	Class I.	Suspicious.
18	Well corner Ninth and Jefferson, §		None,	Clear,	4.50	.000	.030	.013	Class I.	

§Tubular.

Wanklyn classifies water as follows: Class i. Water of more than ordinary organic purity, yielding from .00 up to .05 parts of albuminoid ammonia per 1,000,000 parts of water. Class ii. General drinking waters, safe organically, yielding from .05 up to .10 parts of albuminoid ammonia per 1,000,000 parts of water. Class iii. Dirty waters, yielding from .10 and upward of albuminoid ammonia per 1,000 000 parts of water.

To report upon the character of a drinking-water from chemical examination alone, as to the water being safe or unsafe, is not always possible. In the thorough investigation carried out by the National Board of Health, in the year 1880, this fact was clearly demonstrated. In this examination, waters that were undoubtedly suspicious, as shown by their histories, gave but little organic matter on chemical examination, and were pronounced safe by the analysts according to the classification of the process used. While this was true, the examination also showed that in pure waters nitrites were absent or present only in trace, but in waters known to have carried disease the nitrites were almost invariably present, hence it is safe to look with suspicion upon any water, collected where pollution is to be expected on account of the location, which gives more than a trace of nitrites. Accordingly, after stating the class of the water according to the main process used by me, I have added remarks based upon the presence of nitrates and chlorine. The presence of chlorine in water, in a large quantity, is always suspicious. J. A. TANNER, M.D.

JOSEPH N. MCCORMACK, M. D., *Secretary Kentucky State Board of Health:*

Dear Sir: Obedient to your instructions, I began the microscopical examination of certain waters designated in your letter of the 1st of December, 1884. Great care was taken to collect the samples of water in clean, new bottles, which were kept tightly corked in a cool place until the examination had been completed. The fresh samples were first prepared by evaporating a drop of the water upon the surface of a cover-glass, then placing a fresh drop upon a glass slide, the cover-glass was inverted upon the drop on the slide, and examined with a $\frac{1}{4}$ B. and L. and $\frac{1}{10}$ Wales; then with $\frac{1}{8}$ B. and L. immer.

Some difficulty has followed the attempt to classify the germs found. A bacillus which differs in many particulars from the *B. anthracis*, yet which disposes itself in fish-net or basket-like form, has been denominated *B. reticulata*. This is not red, like the more closely woven coil of the *B. ruber*, but is readily stained with aniline colors.

The greatest care has been observed in heating the culture tubes red hot before introducing the culture fluid, and boiling before dropping the suspected water from the sample bottles. Then, in selecting samples from the product of the cultures, the tube used was always heated red hot just before use for each slide. The best samples of the freshly prepared slides, containing both the fresh water and the culture products, were sealed, so as to permit more careful examination with the $\frac{1}{8}$ hom. immersion of the Bausch and Lomb Optical Company, whose manufacture surpasses in resolving powers the objectives of any other maker.

The results stated in the table are believed to be reliable. DUDLEY S. REYNOLDS, M.D.

MICROSCOPICAL EXAMINATION OF THE DRINKING-WATER OF LOUISVILLE.

By Dudley S. Reynolds, M. D.

No.	SOURCE.	Particles of matter to slide. Estimated. Eye-piece Micrometer.	B. & L. ⅛ob. D eye-piece	Character of matter found in fresh samples taken in dry and in wet weather, embracing forty slides of the water from each source (twenty of each sample.)	Results of culture experiments in freshly prepared Pasteur's fluid, made by Prof. C. Lewis Diehl, and some by Prof. John A. Tanner, 4 tubes of each sample at 60° Fahr., and the same number at 90° Fahr., forming the basis of the conclusions.	REMARKS.
1	River water taken from hydr'nt, river 9 in. on fls.	1st. . . . . 25 2d, ... 28		Particles of clay, small cells or particles of amorphous matter, pieces of soot.	Bacillus subtilis.	Potable.
2	River water taken from hydrant, river 8 feet 11 inches on falls, ...	1st, ... 150 2d, ... 108		Red micrococci, bacilli subtilis, particles of clay, soot, vegetable cells, bits of vegetable fiber, pollen, amorphous matter, and some yeast cells.	Bacilli crudeli, bacilli ruber, bacilli subtilis, and in some tee yeast plant.	Evidently containing the surface washings from the low-lands.
3	Public well, Fifth and York Streets, ...	1st, ... 28 2d, ... 20		Carbonate of lime, decaying wood, amorphous matter and a few vegetable cells, probably lichen from the walls or the pump stock.	Negative.	Potable.
4	Public well, Eighth and Chestnut Streets, ...	1st, ... 80 2d, ... 105		Carb. lime, cells in active motion, masses zoöspores aspergillus in fragments (2d sample, 9th slide), spirilla in bundles, brown particles of amorphous matter.	Mucor-mucedo, bacillus recticulata and a comma bacillus without nucleus.	Dangerous.
5	Public well, Fifth and Jefferson Streets, ...	1st, ... 115 2d, ... 108		Carbonate lime, fine particles of opaque amorphous matter, fine spirilla, ameboid cells, and red amorphous matter.	Mucor-mucedo, bacillus reticulata. The aspergillus glaucus in two tubes.	Dangerous.
6	Public well, Sixth and Jefferson Streets, ...	1st, ... 120 2d, ... 109		Spirilla in bundles, carbonate lime, nucleated cells in motion, amorphous brown matter, zoöspores in masses.	Mucor-mucedo, curved bacilli and the bacillus reticulata.	Dangerous.
7	Public well, Thirteenth and Grayson Streets, . .	1st, ... 218 2d, ... 250		Brown crystals, resembling uric acid, epithelial cells, acari scabei (two in one slide) bacterium termo, ameba, and numerous groups of zoöspores, fragments of aspergillus glaucus and amorphous matter in great quantity.	Mucor, aspergillus, bacillus recticulata, myriads of flagellate bacilli, micrococci in active motion, comma bacilli without nuclei.	Very dangerous.
8	Sixteenth and High Sts.,	1st, ... 180 2d, ... 190		Groups of zoöspores, particles of amorphous matter, bacilli crudeli, minute cells in active motion, two forms spirilla, one in bundles.	Bacillus reticulata, short thick bacteria (B prodigio) myriads of fine micrococci in constant motion, a bacillus having the form of a long whip on a staff.	Very dangerous.
9	Nineteenth and Portland Avenue, ...	1st, ... 200 2d, ... 210		Decaying epithelium, nucleated cells, brown crystals of irregular form, resembling urates, fragments of aspergillus glaucus, great numbers of active ameba, spirilla volutans, oscillaria levis.	Mucor, with medusa-like sporangia, (M. malignans), bacilli flagellata, bacilli reticulata, myriads of active micrococci Aspergillus albicans formed in every culture tube.	Very dangerous. The mucor found in a mounted specimen of fresh water, at 90° F., with large sporangi-like medusa.
10	Eighteenth and High Sts.	1st, ... 190 2d, ... 195		Particles of decaying vegetable matter, nucleated cells, zoospores in groups, active micrococi, small bits of red nostoc, some plates of the sarcina ventriculi, particles of lime and amorphous matter, spirilla in bundles, and the bacillus subtilis.	Aspergillus glaucus on every culture. The B. flagellata, bacillus reticulata, myriads of active micrococci, in a thick slime.	Dangerous. In 5 days the mounts of fresh water, kept at 60° Fahr., were full of bacilli crudeli. In 12 days micrococci alone remained.
11	Eighteenth and Lytle Streets, ...	1st, ... 185 2d, ... 195		Zoöspores in groups, shining cells with nuclei, particles of decaying matter from the pump stock, red micrococci, ameba, various sizes, groups b. crudelli, amorphous matter.	Mucor, aspergillus alb. bacilli reticulata, bacilli flagellata, myriads of active bacteria and micrococci, in a heavy slime, B. crudeli in groups.	Very dangerous. At 90° Fahr. the aspergillus did not appear.
12	17th and Rowan Streets, .	1st, 180.	2d, 190	Do Do Do	Do Do Do	Do Do Do
13	16th and Lytle Streets, . .	1st, 200.	2d, 180	Do Do Do	Do Do Do	Do Do Do
14	18th and Bank Streets, . .	1st, 170.	2d, 185	Do Do Do	Do Do Do	Do Do Do
15	17th and Tyler Avenue, .	1st, 180.	1st, 180	Do Do Do	Do Do Do	Do Do Do
16	Sixteenth and Bank Sts.,	1st, ... 195 2d, ... 210		Do Do Do	Do Do Do	Very dangerous. Mucor and caudate cells with nuclei, 90° F.
17	Third and Market Sts. .	1st, ... 40 2d, ... 55		Particles of lime, amphorous matter, fragments of aspergillus albicans, ameba, spirilli in bundles.	Mucor-mucedo, bacilli reticulatae, and myriads of fine micrococci in active motion.	Doubtful.
18	Ninth and Jefferson Sts ,	1st, ... 85 2d, ... 70		Dark brown particles of amorphous matter, ameba, micrococci in motion, groups of bacilli crudelli, and decaying vegetable cells.	Mucor, with medusa-like heads on long slender sporangia, the bacilli flagellata, B. reticulata, B. subtilis, groups of B. crudeli.	Very dangerous.
19	Floyd and Chestnut Sts.,	1st, ... 108 2d, ... 120		Zoöspores, particles of lime, large active ameba, quantities of small amorphous, dark brown particles, some in motion, pieces decaying woody fiber	A closely woven mycoderm with large quantities of active granules, or micrococci, the bacillus flagellata, B. reticulata, at 90° heavy slime.	Dangerous.
20	Fourth, bet'wn Chestnut and Broadway, ...	1st, ... 20 2d, ... 25		Particles of lime, amorphous matter in fine particles, some particles of lichen.	Negative.	Potable. Bacillus subtilis appeared on 1 slide.

The first samples were all taken between December 3, and December 16, 1884. The second samples were collected during the month of January, 1885. Microzymes are alone subject to cultivation in the manner indicated above. These are all indicative of putrid matters highly prejudicial to health. Intermittent, relapsing, and continued fevers, diphtheria, dysentery, and enteric diseases are likely to follow the use of the waters yielding culture products.

tem is relied upon by a large majority of the inhabitants. These vaults are sunk inside of wooden drums, as was mentioned in describing the wells, and then walled with brick, the drum being left to decay. They always extend to the gravel formation, from twenty to thirty feet—for the express purpose, as I was informed by the officials, contractors, physicians, housewives, and all others with whom I conversed on the subject, that the liquid portion of the contents might drain off into the sand and gravel. From what I could see and learn, the ordinances regulating the cleansing of the vaults receive but little attention from either householders or the authorities, and this was especially noticeable in most of those examined by me in the fever districts. The usual location of the vaults is shown on the map by dotted lines running through the center of the squares, but in many instances they are much nearer the wells, and in one —corner of Grayson and Thirteenth streets, No. 7, in the table of analysis—which supplies the drinking-water for a public school with six hundred and fifty pupils, as well as the immediate community, the female and male vaults for the school are respectively thirty-six and seventy-six feet from the well. In a large number of houses in the better quarters of the city, where water-closets are constructed inside of houses, these, with the bath-rooms and kitchen sinks discharge their contents into "dry-wells" in the yard or cellar. These dry-wells are constructed in the same manner as the vaults, are usually closely covered, and often have no ventilation except back through the drain into the house. It would be difficult to imagine any thing more dangerous to health than these contrivances.

The ordinary way in which the contents of vaults and other receptacles of filth may find their way into the wells is shown by Fig. 6. Here the apex of the cone is at the surface of the filth, and the base at the water level, or an impermeable stratum. In a soil of great porosity, such as we have here, with the wells and vaults in close proximity, it is easy to imagine the lines of filtration in Fig. 5, and those of pollution in Fig. 6 interlacing in the water of the wells; and that this is no imaginary picture is shown by the analysis of the water, and to the thoughtful physician still more clearly by the high death-rate from filth diseases among those who use this water. It has been before stated that under the entire city there exists a sort of underground lake flowing slowly to the northwest. A well sunk to a distance of from thirty five to forty feet at almost any corner furnishes an abundant supply of water from this lake, and from thirty-five to fifty vaults sunk almost to the same level in every square utilizes the same body of water in carrying off their foul contents. In this way thousands of gallons of urine and liquid feces are daily poured into the source of the water-supply, and, as this contamination begins at the southern limits of the city, it would naturally become greater as it passes under it, the wells near the river in the northwestern portion being the foulest. In the main this theoretical view seems to be sustained by the examination of the water, and the prevalence of the fever during the past year, but more extended observations on this point will be necessary to settle this question. It is often urged that the soil is a sufficient filter to prevent this pollution of the water, but when it is remembered how soon an ordinary filter becomes fouled from the passage of water through it not especially impure, and then the quantity of concentrated filth which has been poured into the porous soil under this city for the past hundred years, it will be seen how little reliance can be placed on this natural filter. No doubt it still acts as a strainer, keeping back solid material, but affording little protection against soluble substances.

Among the wealthier classes in the central portion of the city kitchen slops and garbage are probably properly disposed of with a majority, but in the unsewered districts the usual practice is to throw or drain the house refuse into the alleys, gutters, or vaults. In a great many instances shallow trenches for this purpose extend from near the kitchen door to the alley, or around the side of the house to the gutter. In many of the alleys I noticed that the hogs had made extensive wallows, into which the slops and garbage were thrown. If the picture here drawn is an unpleasant one, the people who have made it, and particularly the city authorities who have tolerated and even fostered the "system" and habits

which have made it possible, must be blamed.

These in brief are the facts as I gather them. In a location naturally malarious, and where the strictly malarious diseases still constitute a very considerable part of the sickness, owing to defective drainage and an impure water-supply, we have added the filthy anti-hygienic conditions found in all flat, unsewered towns, and the natural consequence, a high death-rate from what are now known as filth diseases. Thus we see that in ten years there were 1,980 deaths from diarrheal diseases, 346 from scarlet fever, 217 from diphtheria, and 977 from typhoid fever—3,521 deaths from preventable filth diseases. In the light of these instructive, if not pleasant historical facts and surroundings, and of our own investigations, we are to look for the cause of the recent endemic of fever. Typical unhealthy conditions are found on all sides. Leaking vaults or dry wells—a system long since condemned by sanitarians—are found in the rear of most houses, and the exhalations and drainage from these and from the polluted surface soil constantly befoul the atmosphere and water. An analysis of the water used by most of the families in which the disease occurs shows it to be contaminated with organic matter, and under the microscope it is found to be teeming with the lower forms of organic life. The disease is found to be most frequent where the water would naturally be foulest, and in the fall season when the water is lowest and most concentrated, and where the bad sanitary conditions are most abundant. It also occurs in a few cases where hydrant-water is used, and in some houses where the sanitary surroundings are apparently the best. Can we explain these exceptional cases with our present information? No; although special inquiry in each case would no doubt usually show a dry well, defective drain, foul cellar, or impure emanations from neighboring premises; for it may be laid down as a rule that this order of disease only occurs in the presence of sanitary defects. As might be expected from the difficulties naturally surrounding the question, a variety of opinions was found to exist among the physicians as to the exact character of the disease. To these opinions, and especially to the symptoms upon which they were based, I have given most careful attention. Starting out in the investigation with no preconceived notions and with no theory to sustain as to the character or cause of the disease, I am inclined to the opinion, after weighing all the testimony, that it is not specific typhoid fever, but a mongrel type of non-specific fever, produced by the combined influence of filth and malaria—the typho-malarial fever of Woodward, and the continued malarial fever of Loomis. In the later stages of severe and fatal cases, what are known as "typhoid symptoms" were often well marked, as they usually are after a long continued high temperature from any cause, but in a majority of cases few of the distinctive features of typhoid fever were present, and, so far as I can learn, the entire endemic furnished few cases in which there was from the outset that peculiar group of symptoms which should have been commonly present in an outbreak of that disease in the midst of such unfavorable sanitary surroundings. The mild character and short duration of most of the cases, and the large proportion of females and children attacked, taken with the prevalence of malaria, which seems to be antagonistic to typhoid-fever germs, argue strongly in the same direction.

This, however, is a question of scientific rather than of practical interest. Whether or not the polluted water and the exhalations from ponds, vaults, cellars, yards, and alleys produce the disease by their own foulness, or were the hot-beds for the development of the disease germs from ordinarily harmless organisms, or for the reception and multiplication of specific germs from a previous case, are questions which may well be left to the future, as their determination will give us little practical assistance. In any event these conditions are essential to the prevalence of such diseases, and, what is of equal importance, they lower the vital resistance to and largely increase the mortality from all kinds of sickness; and their removal or abatement becomes a necessity if the train of evils which has attended them here and elsewhere is to be avoided. If space permitted I might give the history of scores of cities, in this and other countries, to show the relations between these conditions and the prevalence of such diseases. A few will suffice. In an address delivered before the fifth congress of the Sanitary Institute of Great Britain, Douglass Galton said:

"It may be accepted as certain that in every case where the sewerage of towns has been devised on sound principles, and where the works have been carried on under intelligent supervision, a largely re-

duced death-rate has invariably followed. The records of Newcastle afford evidence of this fact. The quinquennial period beginning in 1868 showed a death-rate of 27.6. The quinquennial period ending in 1881 showed a death-rate of 23.0, while the death-rate of 1881 was only 21.7."

"Munich is the residence of one of the ablest sanitarians of Europe, Dr. Pettenkofer. His admirable illustrations of the effect of the impurities which are accumulated in porous cess-pits upon the air of the town and the death-rate of the population form a text-book of sanitary knowledge."

"At Munich the entire fever mortality per million inhabitants for quinquennial periods was as follows: In 1854 to 1859, when there were absolutely no regulations for keeping the soil clean, 24.2; 1860 to 1865, when reforms were begun, by cementing the sides and bottoms of porous cess-pits, 16.8; 1866 to 1873, where there was partial sewerage, 13.3; 1876 to 1884, when sewerage was complete, 8.7.

"Similarly, at Frankfort-on-the-Main, the deaths from enteric fever per 10,000 were: 1854 to 1859, when there was no sewerage, 8.7; 1875 to 1880, when the sewerage was complete, 2.4.

"At Dantzic the figures present some more striking characteristics; the deaths from enteric fever per 10,000 living were as follows: 1865 to 1869, when there was no sewerage and no proper water-supply, 108; 1871 to 1875, after the introduction of a water-supply, 90; 1876 to 1880, after the introduction of sewerage, 18.

"In Hamburg the deaths from enteric fever per 1,000 of total deaths were: From 1838 to 1844, before the commencement of any sewerage works, 48.5; from 1871 to 1880, after the completion of the works, 13.3. During the time that the works were in progress, viz., from 1872 to 1874, the mortality from enteric fever per 10,000 living was, in the unsewered districts, 40.0; in the districts for the most part sewered, 32.0, and in the fully sewered districts, 26.8.

"These results illustrate the effect of purifying the air of towns by the rapid abstraction of refuse matter, so as to prevent from remaining and putrefying in and upon the ground."

"It may be suggested that the contents of cess-pools can be removed by carts as well as the contents of the vaults."

The pump-water began to attract attention as a cause of this class of diseases in Brooklyn in 1878. The relation was not more direct than I have been able to show here, but the water of one after another of the wells has been subjected to a rigid analysis and condemned, until 653 of 655 wells in the city have been filled, and one of the two remaining is now under condemnation. The advantages to health in Brooklyn have not been less marked than the instances quoted by Captain Galton. A similar though less vigorous course has been pursued in New York, the use of well-water for domestic purposes having been forbidden, and 100,000 privy vaults have been ordered closed within the last month.

Memphis, in its pre-epidemic days, presented conditions very similar to those found here. After suffering a high death-rate for years from the ordinary forms of filth diseases, it required one epidemic of cholera and two of yellow fever to convince them that their water was foul and their general sanitary condition a disgrace. It remains to be seen whether Louisville will wait for further lessons in the school of experience, or profit by that already had at home and seen abroad. It would ordinarily require strong faith to feel hopeful on this subject about a city which, in 1881 (which may be taken as a fair sample year), spent $150,000 for its fire department, $118,000 for its police department, and $1,600 for its health department; but, with a reform mayor, who seems to fully appreciate every interest he has been appointed to guard, the public health will doubtless receive attention.

As to the remedies for these defects, it is only our province to suggest: *First*, The city health department should have a competent analyst, who should frequently and rigidly examine the water from each of the wells, and those found contaminated should be condemned and filled. By filtration, sedimentation, and every other available means, the water-supply from the Ohio River should be improved. Sewers should be constructed much more rapidly than in the past; and where they do exist, every house should be required to connect with them, and all plumbing should be under the supervision of a competent inspector. All existing vaults and dry-wells should be condemned, cleaned, and filled, and the construction of new ones forbidden, or required to be water-tight. Where sewers do not exist, some form of dry-earth closet should take the place of the vaults, the contents being deodorized with cinders,

ashes, or dry clay, and the filled buckets carted away at stated intervals, to be made into compost and sold for fertilizing purposes. This system has long been in satisfactory use in Manchester and other cities in England, as well as in this country, and can be worked at an average cost of two dollars and sixty cents for each family. All garbage should be cremated in the kitchen range and carted away. Physicians should be required to report to the health officer, by postal cards provided for that purpose, every case of communicable disease to which they are called, and prompt action should be taken by that officer, acting in concert with the family physician, to prevent the spread of the same. Less so-called professional dignity and contention about meaningless medical etiquette and more true humanity should govern physicians in the future in regard to reporting and preventing the spread of communicable diseases.

Such organized work presupposes the existence of a board of health for the city provided with both the power and the means for protecting the interests intrusted to it. In the past Louisville seems to have been unfortunate in this respect. With an accomplished physician for its health officer —as I understand has usually been the case—and with a board of health taken from the better class of physicians and leading city officials, it can discharge but few of the functions of a health board, because the powers intrusted to it are scarcely nominal and the funds appropriated to it are too small for any useful work. The board of health should have ample power and money enough for its legitimate expenses and investigations, and then be held to a strict accountability. These remedies are not suggested as experiments, but are such as have been thoroughly tested and approved in other cities. Their adoption would cost money, but Louisville must either spend money to improve its sanitary condition or her citizens must spend it in caring for the preventable sickness and unnecessary deaths of its inhabitants, since several hundred deaths and an average of probably not less than ten cases of sickness for each death occur here every year from preventable causes. The cost of this sickness, and the immense money value of the time and labor lost, as well as the money value of those who die, are as certainly a tax on the citizens of this city as though it was collected by the tax-receiver instead of the doctors, druggists, nurses, and undertakers. The smallest epidemic of cholera would cost more to the city, indirectly, in loss of trade and good name, than would make all the improvements I have indicated; yet all the conditions are here to invite the location and cause the spread of cholera.

The police and fire departments each have an annual appropriation of more than $100,000. Modern sanitary science has demonstrated that a proper enforcement of wise health measures will diminish sickness just as surely as a police and fire department will lessen crime and limit fires. Let the people once fully understand this and the money part of the trouble will be ended, as has been the case in Detroit, Milwaukee, and other cities.

These suggestions have reference to the duties of the city government. Duties no less evident or important remain for individual citizens; for in health matters, as in religion, each individual and each household has duties to perform which can not be left to others. There are probably few houses in the city without defects in the ventilation, heating, or drainage, which, detected or undetected, are impairing the health or lowering the vitality of its occupants. In the construction of most of them every other question has received more consideration than this, because few people have been instructed as to the importance or methods of preserving health. If the head of the household were told that his family was taking in some special poison in their daily food, he would be greatly alarmed and have a rigid investigation made. Why should he be less so because they drink it in from a polluted well, or breathe it in from a foul sewer, dry-well, or cellar?

A thousand of the leading business men of Louisville could no better employ a small part of their time and means than in following the example of Glasgow, Edinburgh, Newport, and Lynn, as New Orleans and St. Louis have recently done, in organizing a Sanitary Protective Association for mutual defense against disease, and for spreading information among the people in regard to the plain laws of health. Small annual dues from each member would create a fund for the employment of an inspector to make monthly visits to the house of each member and point out and suggest the remedies for any dangers to health found to exist. Such an organization would be a stimulus and help to the health depart-

ment. In spite of all that is said to the contrary, my own experience has convinced me that there is no other subject about which people are so anxious to learn, or where they take so much pride in the little knowledge they do possess, as in regard to disease; and a society of this kind, aided as it would be by the press and other educational agencies, which would naturally associate themselves with it, would soon bring about a lasting health reform in Louisville.

No one is more conscious of the incompleteness of this report than myself. Pressed by other duties and hampered by want of funds for necessary investigation, this much has only been possible through the assistance of Drs. Clemens, Bailey, Galt, Kelch, Holland, Pelle, Roberts, McDonough, Allen, Taylor, Grant, Beutel, Rademaker, Simpson, Berry, Parsons, Brandeis, Griffiths, Garr, Mills, Marshall, Murrell, Gilbert, Doherty, Leber, Satterwhite, Larrabee, Bland, Hoskins, Reynolds, and Tanner, and Messrs. Davis, Scowden, Garriott, Duffy, and Harlan; and to each and all of whom I now return my sincere thanks.

Miscellany.

QUININE AS A PARTURIENT. — Andrew Mullan, M. D., in the British Medical Journal of February 28, 1885, reports cases where quinine seemed to hasten the expulsion of the child. The histories given were simply cases of retarded labor. He says quinine given in doses of four grains and upward, in powder, will start pains afresh in twenty or thirty minutes. Repeated at intervals of half an hour or an hour it will maintain them strong. It produces no headache, hardly ever a trace of the cinchonism caused by similar doses under other circumstances, nor sickness, the bitter taste being the only disagreeable circumstance connected with it. The pains it produced are not continuous like those of ergot, but intermittent like those produced by normal labor, and evidently not the result of a special stimulus exerted over the uterus only, but of a tonic effect over the whole economy; the patient often feels stronger.

The action produced when ergot is given alone, in cases where the patient has been exhausted, seems often to be spent in the delivery of the child, leaving the uterus in a state of exhaustion, unable to contract upon and expel the placenta, allowing hemorrhage and necessitating extraction. Such is not the case when quinine is properly used either alone or before the ergot. It can be used when ergot is absolutely contra-indicated with perfect safety both to mother and child. In one case five or six hours intervened between the giving of the first dose and the onset of the pains. Yet the child was delivered all right. When ergot is used, if more than two hours elapse before delivery the child is generally dead. I have seen only one exception to this. Not alone is the good effect of quinine confined to the delivery of the child, but the antipyretic and antiseptic influence of the drug is noticed in the satisfactory recovery of the cases.

MR. T. LAUDER BRUNTON, in the Lettsomian Lectures, speaking of constipation says: "Formerly, while Casualty Physician to St. Bartholomew's, I was accustomed to ask each patient the question, Are your bowels regular? I afterward gave this up because I found it was ambiguous. I one day asked this question of a young woman and she answered, 'Yes, sir.' I then asked, 'How often are they open?' and she replied, 'Once in three weeks, sir.'"

DR. CHAS. J. LUNDY, in Medical Record, speaks highly of the oleate of cocaine. The anesthetic effects of a five-per-cent solution were found to be more marked and to last longer than when the muriate was used. A smaller quantity of the agent is also required to produce the desired result. As a therapeutic agent in such diseases as granular lids, phlyctenular keratitis, blepharospasmus, etc., it is especially valuable.

MARRIED — At the residence of the bride's father, March 6, 1885, Dr. C. M. Rosser, of Leesburg, Texas, to Miss Callie Wilkinson, of Tyler, Texas, Rev. Dr. Andrews officiating. G. B. G.

DR. ELLERSLIE WALLACE formerly Professor of Obstetrics and Gynecology in Jefferson Medical College, died in Philadelphia on March 9th.

DR. HARRISON ALLEN has tendered his resignation of the Chair of Physiology in the University of Pennsylvania.

BELLEVUE'S graduates number 134.

The Louisville Medical News.

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THE SHORT-LIVED LONDONER.

An able lecture, entitled "Degeneracy Amongst Londoners," was recently delivered at the Parkes Museum, London, by Mr. James Cantile.

From a synopsis in the Medical Press of February 4th it appears that the lecturer characterized London as an ozoneless region, where exercise and fresh air could hardly be obtained, and where the sun's rays are deprived of all health-giving power.

A Londoner [as the speaker used the term] is one whose father and mother were born, brought up, and had lived in the area defined, and who himself, or herself, was brought up and had lived in London, and whose only notion of relaxation was a run to the country or the seaside on a bank holiday. It was well-nigh impossible to find a third, and absolutely impossible to find a fourth generation of pure Londoners; the progeny ceased, partly from moral and partly from physical decline and inability of continuance. The pure Londoner of the third generation, which he had been able, after much search and inquiry, to get hold of, was a picture of physical decline, involving shortness of stature, narrowness of chest, deformity of jaws, miserable appearance (squint prevailing), scrofulous diseases, and small head. Pure Londoners were seldom found in the work-house, because they died young. They were able to "light porter," sell papers, and by some such shiftless means earn a livelihood.

It is easy to see by the foregoing that the typical Londoner is by no means to be confounded with the typical Englishman, who, as a rule, is a well-fed, well-conditioned mortal, the living exponent of those qualities, physical, mental, and moral, which have made England the greatest of modern nations. The typical Londoner is the unfortunate poor, whose miserable condition is but the necessary resultant of overwork, under-feeding, smoke, fog, bad air, filth, vice, and the absence of any stimulus to high or worthy endeavor.

In the opinion of Mr. Cantile, this deplorable state of the perennial fog-dweller is to be accredited to absence of ozone in the London air; too little light, too little exercise in fresh air; gin and tobacco. He might have added syphilis.

An assistant surgeon at St. Bartholomew's Hospital has observed that among the sick poor who seek relief in this institution the marks of hereditary syphilis are of almost universal prevalence. He doubted if there was a family among them some of whose members did not show the effects of this taint in ancestral blood. It was further noticeable here that typical cases of the disease, as it is wont to have way in subjects free from hereditary taint, are rare, and that surgeons in various London hospitals had remarked the absence of grave lesions which told the ravages of syphilis in former times, and which are so clearly set forth in the older medical works.

This would seem to show that a widespread syphilitic taint in the squalid inhabitants of London had lessened their susceptibility to the disease when contracted afresh, mitigating its symptoms and modifying its course. But while the virulence of the disease may thus be lessened in individual instances, its influence as a factor in the degeneracy of the typical Cockney as a class is evident in those features so vividly portrayed by Mr. Cantile as characteristic of "generations which represent the survival of the unfittest," such as shortness of stature, narrowness of chest, deformity of jaws,

low-bridged noses, and other so-called scrofulous marks.

Much has been said of late years upon the signs of degeneracy in the human race, and while no little of this may be passed as idle croaking it is certain that in the lower classes of our great cities these signs may be unmistakably seen by him who reads aright.

The lesson which they teach, is not without import, and should be seriously pondered by all who have a care for the public weal, for, while it is clear that many of the factors which make to degeneracy in the lower grades of society are not operative in the upper and middle classes, it is certain that two of them, alcohol and tobacco, belong here by priority of title, while a third, syphilis, though once an exotic plant, has by early transplantation and constant culture become as good as indigenous in this inviting soil, where it is growing an abundant harvest of ill for coming generations.

Bibliography.

Cocaine and Its Use in Ophthalmic and General Surgery. By H. KNAPP, Professor of Ophthalmology in the Medical Department of the University of the City of New York. Reprinted from the Archives of Ophthalmology, December, 1884, with supplementary contributions by Drs. F. H. Bosworth, R. J. Hall, E. L. Keyes, H. Knapp, and William M. Polk. New York and London: G. P. Putnam's Sons. 1885. For sale by John P. Morton & Co.

This is a neat little volume of 87 pages, and contains nearly all the substantial contributions yet made to the literature of cocaine. After giving a translation of the original article of Dr. K. Koller, which first called attention to cocaine as an anesthetic to the eye, the author reviews thoroughly most of the articles upon this subject which have appeared in English, French, and German. To one who has watched the medical journals during the past four months, this would seem no small undertaking. Among the papers of especial interest, after Dr. Koller's, are, Dr. Knapp's, which appeared in the Archives of Ophthalmology; a valuable contribution on the Use of Cocaine in the Upper Air Passages, by Dr. Bosworth; Notes on its Use in Genito-Urinary and in General Surgery, by Drs. E. L. Keyes and R. J. Hall; a Note upon its Use in Gynecology and Obstetrics, by Dr. William M. Polk, and a Report of a Case of Abdominal Section, even to the incision into the peritoneum, by means of the local application of cocaine. The paper by Dr. Koller brings out a fact not generally known to writers upon cocaine, to wit, that its property as a local anesthetic was discovered by Prof. Schroff, and made known to the Medical Society of Vienna as long ago as 1862. Dr. Koller, therefore, is not the discoverer of the anesthetic quality of cocaine, but it is his investigations which have proved this quality to be one of the grandest of therapeutic phenomena.

J. M. R.

Lectures on Diseases of the Rectum. Delivered at the Medical Department of the University of the City of New York. By J. WILLISTON WRIGHT, M. D., Professor of Surgery. New York: Bermingham & Co. 1884. Price $1.25. For sale by John P. Morton & Co.

This is a neat, unpretentious little book. The lectures, though carefully prepared, are printed as they were delivered, as is evidenced by a colloquial style, the free use of anecdotes, and homely illustrations. They can be said to scarcely more than outline the features of the great department of anal surgery, but this they do with such painstaking care that the student may easily complete the picture. The book abounds in good surgery and conservative therapeutics. Nine well wrought illustrations bring before the student the forms of the principal instruments used in rectal operations.

Pyuria, or Pus in the Urine, and its Treatment. Comprising the Diagnosis and Treatment of Acute and Chronic Urethritis, Prostatitis, Cystitis, and Pyelitis, with especial reference to their Local Treatment. By Dr. ROBERT ULTZMANN, Professor of Genito-Urinary Diseases in Vienna Polyclinic. Translated, by permission, by Dr. WALTER B. PLATT, F. R. C. S. (Eng.), Demonstrator of Surgery in the University of Maryland. New York: D. Appleton & Co. 1884. For sale by John P. Morton & Co.

This book is a 12mo of 98 pages. Its author is well known to the profession in this country through the admirable treatise upon the analysis of the urine which bears his name in company with that of Prof. Hoffmann, of Gratz. He is an acknowledged master in urinology, and the book gives evidence in every page of the studi-

ous care with which the German author writes.

The author concerns himself especially with the diagnosis and treatment of such disorders of the genito-urinary tract as render the urine purulent, letting much light in upon the former, and making numerous new and valuable suggestions as to the latter. He believes in local measures for the relief of all inflammatory lesions of this region except the ureters and kidneys, and proves his faith by a record of brilliant results. The book is freely illustrated both in figures of microscopic views and of instruments. The translator has done his work in a most creditable manner.

Smith's Diagram of Parliamentary Rules: together with Concise Hints and Directions for Conducting the Business of Deliberative Assemblies. By URIAH SMITH. Second edition; revised. Battle Creek, Mich: Review and Herald Publishing Association. 1883. Price by mail, fifty cents.

This is a very ingenious device for making easy the study of parliamentary rules. Since any worthy physician may at any meeting of his medical society be called to the chair, some knowledge of the laws regulating assemblies may well be added to his scientific accomplishments. The study of Cushing's Manual is tedious to all and profitable to but few. With this diagram and key the requisite knowledge may be acquired in a few sittings, and will prove an amusement rather than a study, while in times of emergency it may be used without blunder by one who has never before given any thought to parliamentary rules.

Correspondence.

[FROM OUR SPECIAL CORRESPONDENT.]

LONDON LETTER.

A paper on The Influence of Civilization upon Eyesight was read at the last meeting of the Society of Arts by Mr. Blundell Carter, F. R. C. S. He said that the principle he wished to lay down was that the functional perfection and activity of organs throughout the animal kingdom were dependent upon the manner and degree in which those organs were exercised, for while efficient exercise of them not only produced improvement in the individual but also tended toward improvement in his offspring, so limited or imperfect exercise tended toward deterioration alike in the individual and in the race. On every side the old order of things changed giving place to new, and on every side the new might be either better or worse than the old. It did not follow in physiology any more than in morals or politics, that change must of necessity be conducive to improvement. We inherited the eye in all its essential parts from an ancestor not only remote but also common to ourselves and to a large proportion of the animal kingdom, and he thought there could be no doubt, not only that the organ, as civilized man now possessed it, was inferior to that possessed by animals, which we have far outstripped in other particulars, but also that among ourselves it had fallen very decidedly below the standard of excellence which it had attained in some of the families of the human race. Humboldt was once traveling in South America and became separated from his party, being only attended by his guide who, when the traveler expressed a fear that they had lost their companions, pointed across a valley some miles in width, and said he could see them, and Humboldt with the aid of a powerful telescope convinced himself of the truth of the statement. An enormously large proportion of the whole German nation was composed of the wearers of spectacles, and there was abundant evidence that the need for such assisiance dated from a comparatively recent period. Last year his friend Mr. Adams Frost examined a board school in the south of London, and found that seventy-three children out of two hundred and sixty-seven, or rather more than a fourth, had defective or subnormal vision. If we inquired the reason why the eyes should undergo deterioration while other physical organs steadily advanced in vigor and development, we should find the explanation to be two-fold. In the first place, the constant use of the eyes on near subjects was injurions to them. In the second, the delerioration was partly due to popular ignorance on the subject of what the eyes ought to be able to accomplish. All that was required in order to bring about their improvement, was the direction to them and to their functions of the same amount and kind of attention which was at present bestowed upon other physical capabilities of the human race. What he might fairly describe as national neglect of the culture of the eyes, and of efforts to improve the faculty of seeing, was chiefly due to the prevailing

absence of knowledge concerning the proper range and scope of the visual function, and hence concerning the powers which the eyes ought to possess. In conclusion Mr. Carter expressed his opinion that if public attention were once fairly directed to the question, if the eye received as much attention as the muscles, and if an intelligent knowledge of what they ought to accomplish were diffused abroad, that our country, in the course of two or three generations, would be peopled by a race who might engage, if not without fear, yet certainly without disgrace in a seeing contest with any other representative of the human family.

Dr. J. R. Mann, F. R. C. S., said that from personal experience he could vouch for the truth of the statement that the uncivilized races had better sight than ourselves. He had frequently observed the visual strength of the natives of Africa, and their vast superiority over us in that respect. He was fully convinced that this degeneration in sight resulted from usage and not from any inferiority to those spending most of their time in the open air. He was also sure that degeneration was inherited and handed down with increasing loss of power from father to son.

Mr. Browning said that in the whole course of his large experience he had always a difficulty in persuading short-sighted people to wear spectacles, and he was sure that the most disastrous results must ensue if people confine themselves to seeing objects at about the distance of seven inches from them.

Since Mr. Justice Stephen declared from the Bench that the cremation of a dead body, if effected without nuisance to others, is a legal proceeding, the Cremation Society is about to act accordingly. They have just published a short circular which opens with a statement that the legal difficulty has been got over. A declaration follows of the objects which the Society exists to promote, viz., the rapid dissolution of the body into its component elements by a process inoffensive to the living, while rendering the dead absolutely innocuous. Then comes conditions of membership, which are merely a signed adhesion to cremation principles and an annual guinea subscription; then a form of medical certificate, stating cause of death to be signed by two doctors; and then a commercial announcement that an enterprising firm are prepared to remove your body to Woking from London at the very moderate cost of £5 10s., your friends providing you with a shell and a shroud. When the body gets there it is cremated very rapidly, in presence of a witness if required, for the further sum of £6 pounds, after which the ashes will be faithfully delivered to any friend requiring them.

At a meeting of the Cambridge Medical Society Mr. Wallis drew attention to perineal section for cystitis in fractured spine. He had performed this operation in the case of a man admitted into the hospital with fracture of the cervical spine, and in whom severe cystitis was rapidly bringing on a fatal issue. The operation was performed in the usual manner, and a long elastic tube inserted. The result as concerning the cystitis was immediately beneficial, and the patient rapidly rallied from his dying condition and gained flesh. He died subsequently from other complications.

Sir Prescott G. Hewett communicated at the last meeting of the Royal Medical Society a case of displacement and fracture of the axis which occurred ten years ago in a man aged seventy-five, and was produced by falling on the vertex from a wall six feet in height. After recovering consciousness the patient experienced great pain in the neck. The head was bent back and carried stiffly, nasal respiration was obstructed, and the mouth kept open to render it easier. Deglutition was difficult, the voice had a nasal intonation, and a hard swelling could be seen and felt projecting from the back of the pharynx. There was no paralysis nor anesthesia. The patient died in July, 1884, from senile gangrene, a disease having no connection with the injury. At the post-mortem examination it was found that the axis was bent back to an angle of 60°; the bodies of the second and third vetebræ were anchylosed, and the arch of the third was partially telescoped into that of the second, to which it had become anchylosed. The cord was gently bent opposite the site of injury and the spinal canal at this point was quite wide and roomy. Two similar cases had been observed by Sir Prescott Hewett, and a specimen of an injury of this nature had been discovered by Sir James Paget in a churchyard.

Artificial sea air is suggested as a welcome addition to the sick-room, and it may be prepared by using a solution of peroxide of hydrogen (ten volumes in strength) containing one per cent of ozonic ether, iodine to saturation, and 2.50 per cent of sea salt.

Two ounces of this mixture are to be diffused by means of a fine spray during a quarter of an hour. It is a good disinfectant and deodorizer, gives a pleasant sea odor and purifies the apartments.

The Treasury has appointed temporarily six additional medical inspectors to take precautionary steps against the infection and spread of cholera, should it make its appearance.

LONDON, February, 1885.

Selections.

INOCULATION OF COMMA-BACILLUS CULTIVATIONS. — Dr. van Ermengen has announced to the Acadamy of Medicine, Brussels, that he has succeeded in inoculating animals with cultures of the comma-bacillus. He first directly injected a few drops (one drop of culture to one grain of injection fluid) into the duodenum. The four rabbits died with choleraic symptoms, after evacuations containg comma bacilli. The autopsy showed a healthy peritoneum, inflammation of the small intestine, and acute catarrh. He then injected very small portions of a drop; of twelve animals so operated on only two survived. His control experiments have shown that the other curved organisms that are found in the intestinal tract never have the same microscopical characters as the comma bacillus, and that if these are inoculated no results are obtained, and the same with the injection of other putrid or fecal substances. In one case he found the straight bacillus of septicemia. — *Medical Press and Circular.*

CAFFEIN IN HEART DISEASE. — Riegel, after extended trial of this remedy and its preparation, formulates his conclusions as follows:

1. Caffein is a heart regulator and diuretic in the same sense that digitalis is.

2. Caffein in suitable dose and form increases the power of the heart, slows it action, and increases arterial tension, producing this effect soon after its administration.

3. Caffein acts rapidly as a diuretic.

4. The indications for the use of caffein are in general the same as those for the use of digitalis.

5. Caffein is best administered in small and frequently repeated doses. In most cases one to one and a half grams of the double salt daily is sufficient, though it is safer to begin with smaller doses.

6. The main difference between the effect of caffein and that of digitalis is that the former is much more prompt and is not cumulative.

7. In many cases in which digitalis fails caffein will succeed.

8. It is not advisable to give morphia at the same time with caffein; the latter, in that it restores the failing compensation, is practically a narcotic in these cases.

9. Caffein, and especiallly its soluble double salts, sodio-caffein benzoate, salicylate, and cinnmaylate, the solubility of which favors their subcutaneous use also, are as a rule better borne than is digitalis.

Becher's results are not materially different from those of Riegel. Diuresis goes hand in hand with the tonic effect of the drug upon the heart, and this observer also found that caffein succeeds sometimes when digitalis fails. He does not seem to have used the double salts, but thinks that of the more common preparations the hydrobromate is less likely to make the patient wakeful.—*Boston Med. and Surg. Journal.*

THE PATHOGENESIS OF EPILEPSY.—As the result of his experimental investigations (previously referred to in these columns) into the subject of the pathogenesis of epilepsy, Dr. P. Rosenbach, of St. Petersburg (*Virchow's Archiv*), arrives at the following conclusions: (1) The attacks of epilepsy that are produced in dogs by electrical stimulation of the brain are the results of an irritation of the cortical centers, and afford, according to the conditions of stimulation, the greatest similarity to the cortical or to idiopathic epilepsy of the human subject. (2) No essential difference, pathogenically considered, exists between the so-called cortical and idiopathic epilepsy, but still, inasmuch as the former is a symptom and a result of an organic cerebral affection, and in its clinical course is not identical with the latter, it must be differentiated as organic from idiopathic (functional) epilepsy. (3) The convulsive attacks of idiopathic epilepsy as well as attacks of *petit mal*, are effects of morbid excitation of the cerebral cortex. (4) The diversities of the clinical phenomena of epilepsy are due to diversity of the kind and the degree of extent of the pathological cortical excitation that originates the attack. (5) The theory that places the point of origin of the epileptic attack in the centers of the medulla oblon-

gata and pons varolii is not in accord with the clinical symptoms of the disease, and is not based on satisfactorily secure facts.—*Medical Press and Circular.*

THE BACILLUS LEPRÆ.—The occurrence of a case of leprosy in the Elizabeth Hospital has afforded Dr. P. Guttmann the opportunity of studying the characters and distribution of the bacilli in the diseased tissue, and he recently gave a demonstration on the subject at the Berlin Medical Society (*Berlin Klin. Wochenschrift*). Portions of leprous nodules excised from the skin and transferred to alcohol were examined. He says that the detection of the bacilli is very easy, even in unstained fresh preparations; for they are endowed with a characteristic motility, at once apparent when the leprous tissue is teased out in a drop of distilled water and examined with an oil-immersion lens (650 diam.) and Abbe's condenser. Hansen originally observed these movements even within the cells, but of course it is essential that the preparation should be a moist one. These living bacilli are thicker than those which have been submitted to shrinking in the alcohol and stained preparations; in length they vary from a quarter to half or even three quarters of the diameter of a red corpuscle. They mostly contain spores, which may be placed at the extremities of the bacillus or irregularly disposed in its substance. Koch discovered that the leprosy bacillus has the same color reaction as the bacillus tûberculosis, *i. e.*, it has a great affinity for methyl-blue in slightly alkaline and alcoholic solution, retaining this stain after the object has been impregnated with other coloring agents, *e. g.*, vesuvin. Dr. Guttmann confirms the statement of Baumgarten that the bacillus lepræ takes up the coloring matter more rapidly than the tubercle bacillus; but the resemblance between the two is very close. It is thought that the constancy with which the former are found lying transversely in the leprous cells, even in the teased-out preparations, may aid in distinguishing them; but in tubercle the bacilli are also to be found within cells, especially the giant cells. In the leprous nodule the cells are often thickly crowded with bacilli, and after double staining of the sections with fuchsin and methyl-blue the bacillary cells appear red, those free from bacilli being blue. The bacillary invasion commences in the upper layers of the corium, and but rarely attacks the Malpighian layer of the epidermis or the cells of the cutaneous glands. The organism has been found in the leprous tissue, in the mucous membranes of the mouth and larynx, in lymphatic glands, in the liver, spleen, testicle, and in the cornea and nerves. It has also been found in the blood, but it is probable that this observation, unconfirmed by many, is to be explained by the bacilli being pressed out of lymphatics into the puncture made for the purpose of obtaining the drop of blood for examination. There can be no doubt, adds Dr. Guttmann, that these bacilli are the cause of leprosy, although confirmatory evidence has not yet been obtained of the transmission of the disease by the inoculation of animals. Leprosy, however, has never yet been observed in animals.—*Lancet.*

To cut short the paroxysms in whooping cough, Prof. DaCosta recommends the inhalation of

℞. Sodii bromid., ... grs. xx;
Fld. ext. belladonna, ... gtts. ij.

Sig. Use as a spray just before the occurrence of the paroxysm.

In the interval quinine should be pushed to the point of tolerance.—*Med. and Surg. Reporter.*

PROF. TIFFANY, at the Hospital of the University of Maryland, recently removed a stone weighing 556 grains from the pelvis of the right kidney of a man aged 26.

ARMY MEDICAL INTELLIGENCE.

OFFICIAL LIST of Changes in the Stations and Duties of Officers serving in the Medical Department of the United States Army, from March 8, 1885, to March 14, 1885:

Army Medical Board to meet in New York City, April 6, 1885. Detail for Board: Lt. Col. Jos. B. Brown, Surgeon, Maj. Anthony Heger, Surgeon, Maj. Jno. H. Janeway, Surgeon. Surgeon Heger to be relieved from duty in Dept. East, and Surgeon Janeway to perform duties on the board in addition to his present duties. (S. O. 56, A. G. O., March 11, 1885.)

Brown, H. E., Major and Surgeon, granted leave of absence for one month, with permission to apply for two months' extension. (S. O. 48, Dp. East, March 6, 1885. *Taylor, Blair D.*, Captain and Asst. Surgeon, leave of absence extended two months. (S. O. 54, A. G. O., March 9, 1885.)

OFFICIAL LIST of Changes of Stations and Duties of Medical Officers of the United States Marine Hospital Service for the week ended March 14, 1885.

Bailhache, P. H., Surgeon. Detailed as President Board of Examiners, March 10, 1885. *Purviance, George*, Surgeon. Detailed as member Board of Examiners, March 10, 1885. *Austin, H. W.*, Surgeon. Detailed as Recorder Board of Examiners, March 10, 1885.